

IVANOV, Yu. V.

Vascular reactions in hypertension and their dynamics in protective inhibition therapy. Terap.arkh. 29 no.4:76-78 Ap '57. (MIRA 10:10)

1. Iz kliniki fakul'tetskoy terapii lachebnogo fakul'teta (dir. - prof. L.A.Varshamov) Saratovskogo meditsinskogo instituta.

(HYPERTENSION, therapy,

sleep ther., vasc. reactions (Rus))

(SLEEP, therapeutic use,

hypertension, vasc. reactions (Rus))

TEMKIN, L.Ye., inzh., nauchn. red.; OVSYANKIN, V.I., red.; STRELETSKIY, N.S.,  
prof., red.; GVOZDEV, A.A., prof., red.; IVANOV, Yu.M., red.; SE-  
MENTSOV, S.A., kand. tekhn. nauk, red.; GALKIN, Ya.G., red.; KRASIL'-  
NIKOV, P.A., red.; MURASHEV, V.I., red. [deceased]; NIKITIN, N.V.,  
red.; TAL', K.E., kand. tekhn. nauk, red.; VILKOV, G.N., red. izd-va;  
GARNUKHIN, Ye.K., tekhn. red.

[Papers from the International Conference on Designing Building  
Elements] Materialy Mezhdunarodnogo soveshchaniya po raschetu stroitel'-  
nykh konstruktсий. Moscow, 1958. Moskva, Gos. izd-vo lit-ry po stroit.,  
arkhit. i stroit. materialam, 1961. 258 p. (MIRA 14:7)

1. Mezhdunarodnoye soveshchaniye po raschetu stroitel'nykh konstruktсий.  
Moscow, 1958. 2. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitek-  
tury SSSR (for Streletskiy, Gvozdev). 3. Chlen-korrespondent Akademii  
stroitel'stva i arkhitektury SSSR (for Sementsov, Tal')  
(Building)

L 36410-66 SWT(i) 100(c) WW

ACC NR: AP6022018

SOURCE CODE: UR/0120/66/000/003/0160/0162

AUTHOR: Lyubotov, Yu. N.; Ivanov, Yu. M.

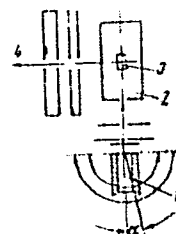
ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Mass-spectrometer outfit for studying the distribution of intensity of molecular beam in space

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 160-162

TOPIC TAGS: mass spectrometer, molecular beam

ABSTRACT: The development is reported of a special outfit consisting of an MI-1301 (Soviet-made) mass spectrometer and a special chamber. The chamber houses a molecular gun with a mechanism for moving it with respect to the ionization space of the spectrometer. The molecules emerging from evaporation cell 1 (see figure) enter ionization box 2 at right angles to electron 3 and ion 4 beams. The driving mechanism is explained. The angular distribution of  $Mg^{24}$  particles emerging from a cylindrical effusion crucible is shown, as is the curve of beam-density distribution over the cross-section of the crucible port. The ion-current measurement error is 3% or less. The outfit operates at pressures 0.0001-1 torr in the molecule source. Furnace-temperature stability is  $10^{\circ}/hr$  or better within 300-1000C. Orig. art. has: 5 figures.



[03]

Fig. 1. Molecular gun

SUB CODE: 20 / SUBM DATE: 25May65 / ORIG REF: 003 / OTH REF: 001 / ATD PRESS: 5039

UDC: 621.384.8:539.198

Card 1/1 1116P

L 34423-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JG/WB  
 ACC NR: AP6003318 SOURCE CODE: UR/0365/66/002/001/0032/0037  
 AUTHOR: Tomashev, N. D.; Ivanov, Yu. M.  
 ORG: State Scientific-Research and Planning Institute of the Rare-Metal Industry, AN SSSR (Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti AN SSSR); Institute of Physical Chemistry (Institut fizicheskoy khimii)  
 TITLE: Effect of palladium on the corrosion resistance of titanium  
 SOURCE: Zashchita metallov, v. 2, no. 1, 1966, 32-37  
 TOPIC TAGS: titanium, titanium alloy, corrosion resistance, palladium  
 ABSTRACT: An investigation was made of the corrosion resistance of non-alloyed Ti and Ti containing 0.01, 0.05, 0.1, 0.2, and 0.5% Pd in HCl (5-30% concentrations at 25C, 50C, and at boiling temperature),  $H_2SO_4$  (10-80% concentrations at 25C, 50C, and at boiling temperature), and  $HCOOH$  (85% concentration at boiling temperature). The results, given in the table, showed that there was no lower boundary of Pd concentration below which the passivation of Ti ceased to exist. The necessary concentration of Pd in the Ti-Pd alloy depended on the corrosive activity of the medium. For instance, the addition of  $\leq 0.05\%$  Pd increased the corrosion resistance of Ti in an 85% solution of  $HCOOH$  at boiling temperature and in  $\leq 10\%$  solutions of HCl at temperatures  $\leq 50C$ . The  
 Cord 1/2 UEC: 546.319:821.98 : 620.193

L 34423-66

ACC NR: AP6003318

same addition of Pd decreased considerably the corrosion resistance of Ti in more corrosive media. The alloy Ti + 0.2% Pd, which has a sufficiently high resistance to corrosion in all the media investigated except 80% H<sub>2</sub>SO<sub>4</sub> solution, should be considered the most universal. The increase of the Pd content to  $\pm 0.5\%$ , as a rule, had little effect on the corrosion resistance of Ti and evidently is not justified economically. It was found that Pd, added to Ti, decreased the overvoltage of the cathode reaction and displaced the stationary potential of Ti to more positive values. This resulted in an increase in the rate of dissolution in the active region. The larger additions of Pd provided for a transition into the region where Ti is partly or fully passive. The small deceleration of the anodic process observed during the addition of Pd was related to the mechanical effect of a part of the Ti surface. The addition of 0.2% Pd to the alloy OT4, which is widely used in structures, resulted in the formation of an alloy combining elevated mechanical properties with corrosion resistance. Orig. art. has: 3 fig. and 1 table.

SUB CODE: //13/ SUBM DATE: 23May65/ ORIG REF: 005/ OTH REF: 002

Card 2/2 BLL

L 6336-66 EWT(m)/EPF(c)/EWP(j)/T RPL WW/RM

ACCESSION NR: AP5019878

UR/0181/65/007/008/2529/2532

AUTHOR: Ivanov, Yu. M.

TITLE: Concerning the coefficient Gamma in the equation for long term strength

SOURCE: Fizika tverdogo tela, v. 7, no. 8, 1965, 2529-2532

TOPIC TAGS: ultimate strength, polymer, polystyrene, polymethylmetacrylate, temperature dependence, structural plastic

ABSTRACT: It is shown that Zhurkov's equation (Vestn. AN SSSR v. 11, 78, 1957) for long-term strength does not apply experimentally to all substances, and that many materials, especially polymethylmetacrylate, polystyrene, and celluloid, as well as all other types of polymer films and fibers differ from it appreciably. This discrepancy between Zhurkov's equation and experimental data is manifest in the fact that the slope of the plot of the long-term strength against the stress is not equal for these substances, and the coefficient  $\gamma$  which enters into this equation is not constant as called for by Zhurkov's theory. In fact,  $\gamma$  is shown to be a decreasing linear function of the temperature. This indicates the importance of a detailed study of the influence of temperature on the coefficient  $\gamma$  of polymer materials, especially those intended for construction purposes. Orig. art. has: 2 figures, 4 formulas, and 1 table.

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0902 0030

L 6336-66

ACCESSION NR: AP5019878

ASSOCIATION: Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruksiy im. V. A. Kucherenko, Moscow (Central Scientific Research Institute of Building Construction) 445

SUBMITTED: 15Mar65

ENCL: 00

SUB CODE: HS, MT

NR REF SOV: 011

OTHER: 000

6C  
Card 2/2

AKHMEDZYANOV, R.B., zasluzhennyy vrach RSFSR; NAUMTSEVA, A.G.; RADAYEV,  
V.P.; IVANOV, Yu.M.

Defects of posture and scoliosis. Ortop., travm. i protez. 26  
no.2:74 F '65. (MIRA 18:5)

1. Adres avtorov: Kuybyshev (obl.), Polevaya ulitsa, dom 80,  
Bol'nitsa imeni Pirogova.



**"APPROVED FOR RELEASE: 08/10/2001**

**CIA-RDP86-00513R000619210013-8**

**APPROVED FOR RELEASE: 08/10/2001**

**CIA-RDP86-00513R000619210013-8"**

"APPROVED FOR RELEASE: 08/10/2001

CIA-RDP86-00513R000619210013-8

Card 2/2

APPROVED FOR RELEASE: 08/10/2001

CIA-RDP86-00513R000619210013-8"

Card 1/2

L 54980-65  
ACCESSION NR: AP5007630

3

109 ... it was found that the treatment of the Ti-0.1% Pd alloy with HCl ... of the sample by a factor of at

NO REF 907- 005

OTHER: 000

Card 2/2

IVANOV, YU. M.

56-1-51/56

AUTHORS: Ivanov, Yu. M. , Kirillov-Ugryumov, V. G.

TITLE: The Dependence of the Angular Correlation in the  $\mu^-e^-$ -Decay of Energy (Zavisimost' uglovoy korrelyatsii pri  $\mu^-e^-$  raspade ot energii)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 1, pp. 255 - 256 (USSR)

ABSTRACT: At first reference is made to papers dealing with the same subject. The authors investigated the angular correlation in the decay of negative myons in an emulsion. A stack of photo-emulsion layers НМКФМ-Р with a diameter of 10 cm and a thickness of 400  $\mu$  was irradiated with a beam of negative myons of the phasotron of the United Institute for Nuclear Research (Ob'yedineniy institut yadernykh issledovaniy). The negative myons were produced in the decay of negative pions with the energy 350 MeV and were then filtered from foreign particles with a carbon-filter. In the emulsion the negative myons were recorded with an energy lying close to the maximum energy. The beam of negative myons could be considered polarized. In the examination of the individual emulsion layers the shut-down of myons with long ranges with decay electrons was observed. Altogether 630 cases of  $\mu^-e^-$ -decays were

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56-1-51/56

The Dependence of the Angular Correlation in the  $\mu^-e^-$ -Decay of Energy

utilized. The energy of the electrons was measured by the method of multiple scattering. In order to be able to compare the experimental data with the formula given here, the angle  $\vartheta$  between the direction of the impulse of the electron emitted in the decay and the spin of the myon must be measured. In 135 cases of  $\mu^-e^-$ -decays 64 electrons flew forward ( $0 \leq \vartheta \leq 90^\circ$ ) and 71 electrons flew backward ( $90^\circ < \vartheta < 180^\circ$ ). The spin of the myon is at least in some particles supposed to retain the original direction in the emulsion until the moment of decay. A diagram shows the energy spectra separately for the electrons flying off forward and backward. For the energies  $E > 0,6$  the ratio of the electrons "forward-backward" amounts to 25 : 36. At small energies ( $E < 0$ ) 39 particles flew forward and 35 backward. Moreover the asymmetry was investigated in various angular intervals, the "forward-backward" ratios found at energies of  $> 35$  MeV are summarized in a table. Further diagrams compare the energy spectra in different angular intervals with the corresponding theoretical curves. From the analysis of the angular correlation of the  $\mu^-e^-$ -decay follows a qualitative agreement with the theory of the two-component neutrino. Unfortunately the existing data are not sufficient for quantitative conclusions. There are 2 figures, 1 table, and 4 references, 3 of which are Slavic.

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56-1-51/56

The Dependence of the Angular Correlation in the  $\mu^-e^-$ -Decay of Energy

ASSOCIATION: Moscow Engineering-Physical Institute  
(Moskovskiy inzhenerno-fizicheskiy institut)

SUBMITTED: October 28, 1957

AVAILABLE: Library of Congress

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.21(7)

SOV/54-35-5-43/56

AUTHORS: Ivanov, Yu. M., Fesenko, A. I.

TITLE: The Depolarization of  $\mu^+$ -Mesons in Nuclear Emulsions With Varying Content of Gelatin (Depolyarizatsiya  $\mu^+$ -mezonov v yadernykh emul'siyakh s razlichnym sodержaniyem zhelatiny)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol.35, Nr 5, pp 1297-1298 (USSR)

ABSTRACT: The present paper aims at explaining the dependence of the spin depolarization of a positive myon on the relative share of the different components of the emulsion. For this purpose the asymmetry of the distribution of the electrons emitted in the  $\mu^+ \rightarrow e^+ \nu$  decay acts (in a forward and rearward direction) is investigated. A chamber composed of layers of the usual NIKFI (type "R") emulsions was irradiated with a positive pion beam of the phasotron of the OIYAI (Joint Institute for Nuclear Research). During investigation of the emulsion, the  $\pi^+ \rightarrow \mu^+ \rightarrow e^+$ -decays which developed entirely in an emulsion layer, were recorded. Results are given in a table. For the emulsions of all sorts investigated the ratio

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SOV/56-35-5-43/56

The Depolarization of  $\mu^+$ -Mesons in Nuclear Emulsions With Varying Content of Gelatin

$$A = \frac{2(N_{\text{backward}} - N_{\text{forward}})}{N_{\text{backward}} + N_{\text{forward}}} \quad \text{was calculated.}$$

Here  $N_{\text{backward}}$ ,  $N_{\text{forward}}$  denote the number of electrons emitted in a backward and forward direction respectively. Also after taking all corrections and error sources into account the results obtained indicate a growth of angular asymmetry with an increase of the portion per weight of the gelatin in the nuclear emulsion. At present endeavors are being made to obtain more experimental data for the purpose of fully explaining the character of this dependence. Besides, 1198 cases

of  $\pi^+ \rightarrow \mu^+ \rightarrow e^+$ -decays were dealt with, which were discovered in a fourfold diluted  $(C_2H_5OH)_2N$ -containing emulsion. In this case the asymmetry coefficient is  $(0.182 \pm 0.058)$ . The authors thank Professor I. I. Gurevich and V. G. Kirillov-Ugryumov for the interest they displayed in this work, and they also express their gratitude to Z. S. Galkina, G. I. Polosina and A. V. Smelyanskaya for their help in investigating the emulsion. There are 1 figure, 2 tables, and 5 references, 1 of which is Soviet.

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SOV/56-35-5-43/56

The Depolarization of  $\mu^+$ -Mesons in Nuclear Emulsions With Varying Content of Gelatin

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy Institut  
(Moscow Engineering-Physics Institute)

SUBMITTED: July 9, 1958

Card 3/3

KIRILLOV-UGHYUMOV, V.G.; IVANOV, Yu.M.

Beam of  $\mu$ -mesons with energies up to 70 Mev, produced in an  
accelerator. Nek. vop. eksp. fiz. no.1:3-12 '59. (MIRA 13:2)  
(Mesons)

88418

S/056/60/039/006/002/063  
B006/B056

21.5200  
AUTHORS:

Ivanov, Yu. M., Fesenko, A. I.

TITLE:

Investigation of the Depolarization of  $\mu^+$ -Mesons in Nuclear Emulsions

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,  
Vol. 39, No. 6 (12), pp. 1492 - 1496

TEXT: The authors wanted to determine the effect of the relative AgBr-content of a nuclear emulsion upon the asymmetry coefficients for the  $\mu^+ - e^+$  decay. An emulsion chamber consisting of free НИКФИ-Р (NIKFI-R) emulsion layers of four different kinds (with different AgBr-content) was exposed to a positive 350-Mev pion beam. The chamber was surrounded by a double iron shield, which attenuated the strength of the scattered field of the accelerator and the terrestrial field to 0.04 oersted. The flux was  $5 \cdot 10^4 / \text{cm}^2$ . Work was carried out with ordinary, 2-, 3- and 4-fold diluted NIKFI gelatin emulsion. Concerning the emulsions used, the data of the NIKFI (Scientific Cinematic and Photographic Research Institute), and of the FIAN

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Investigation of the Depolarization of  
 $\mu^+$ -Mesons in Nuclear Emulsions

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S/056/60/039/006/002/063  
B006/B056

(Institute of Physics of the AS) are compared with the authors' own data. On the irradiated plates, a total of 45457  $\pi^+-\mu^+-e^+$  decay events was recorded, and after evaluation (selection of events with  $\mu^+$ -path lengths  $> 50\mu$  in the emulsion), 38.192 still remained. The numerical results are given in Table 2. After carrying out the corrections, which are discussed in detail, the asymmetry coefficients for the four degrees of dilution of the emulsions were obtained:  $\alpha_{2x1} = 0.100 \pm 0.018$ ;  $\alpha_{2x2} = 0.133 \pm 0.022$

$$\alpha_{2x3} = 0.153 \pm 0.020 \quad \alpha_{2x4} = 0.170 \pm 0.022.$$

From the data obtained it is possible, by using the formula  $P = 3\alpha$ , to determine the residual polarization of  $\mu^+$ -mesons in AgBr and gelatin separately. For this purpose formula  $P = P_1\gamma + P_2(1-\gamma)$  is used, where  $P_1$  and  $P_2$  are the  $\mu^+$ -polarization in the decay into gelatin and AgBr, respectively, AgBr,  $\gamma = xS/(1+xS)$  is the relative number of  $\mu^+$  stopping points in gelatin,  $x$  is the volume ratio of gelatin to AgBr,  $S$  is the moderating property of the gelatin referred to that of AgBr.  $S$  was between 0.34 and unity, and thus one obtained for  $P_2$  a value of between 0.09 and

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Investigation of the Depolarization of  
 $\mu^+$ -Mesons in Nuclear Emulsions

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B006/B056

0.12 and for  $P_1$  of 0.9 - 0.7. An examination of the results obtained by other authors makes a value of  $S = 0.8$  appear to be probable. Thus,  $P_1 = 0.72 \pm 0.22$  and  $P_2 = 0 \pm 0.11$ . The strong  $\mu^+$ -depolarization in AgBr is discussed from the viewpoint that the latter, apart from multiple electron exchange, is interrelated with the formation of mesonium. The authors finally thank Professor I. I. Gurevich for his advice and interest, Professor V. I. Gol'danskiy and B. A. Nikol'skiy for discussions, and Z. S. Galkin, G. I. Polosin, and A. V. Smelyanskaya for their help in evaluating the emulsions. There are 1 figure, 2 tables, and 20 references: 7 Soviet, 2 Italian, and 10 US. X

ASSOCIATION: Moskovskiy inzhenerno-fizicheskiy institut (Moscow Institute of Physics and Engineering)

SUBMITTED: April 23, 1960 (initially) and July 28, 1960 (after revision)

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S/056/60/039/006/002/063  
B006/B056

Таблица 2

1	2	3	4	5	6
Кол-во различ- ных	Полное число случаев	И перех	И запад	а	Процент необлю- дуемых показ- ателей
1	14,184	5,561	8,081	0,089	0,34
2	9,902	3,031	4,420	0,117	0,59
3	11,547	4,514	5,102	0,122	1,73
4	9,824	3,697	4,209	0,151	3,9

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B006/B056

Text to Table 2: 1) Dilution, n-fold. 2) Total number of events.  
3)  $N_{\text{forward}}$ . 4)  $N_{\text{backward}}$ . 5) Unobserved positrons, %.

X

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IVANOV, YU. M.

95

5/089/62/013/006/019/027  
B102/B186

AUTHORS: G. T. and M. R.

TITLE: Nauchnaya konferentsiya Moskovskogo inzhenerno-fizicheskogo instituta (Scientific Conference of the Moscow Engineering Physics Institute) 1962

PERIODICAL: Atomnaya energiya, v. 13, no. 6, 1962, 603 - 606

TEXT: The annual conference took place in May 1962 with more than 400 delegates participating. A review is given of these lectures that are assumed to be of interest for the readers of Atomnaya energiya. They are following: A. I. Leypunskiy, future of fast reactors; A. A. Vasil'yev, design of accelerators for superhigh energies; I. Ya. Pomeranchuk, analyticity, unitarity, and asymptotic behavior of strong interactions at high energies; A. B. Migdal, phenomenological theory for the many-body problem; Yu. D. Fivyskiy, deceleration of medium-energy antiprotons in matter; Yu. M. Kogan, Ya. A. Iosilevskiy, theory of the Mössbauer effect; M. I. Ryazanov, theory of ionisation losses in nonhomogeneous medium; Yu. B. Ivanov, A. A. Rukhadse, h-f conductivity of subcritical plasma;

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Nauchnaya konferentsiya...

S/089/62/013/006/019/027  
B102/B186

Ye. Ye. Lovetskiy, A. A. Rukhadze, electromagnetic waves in nonhomogeneous plasma; Yu. D. Kotov, I. L. Rozental', the origin of fast cosmic muons; Yu. M. Ivanov, muon depolarization in solids; V. G. Varlamov, Yu. M. Grashin, B. A. Dolgoshein, V. G. Kirillov-Ugryumov, V. S. Roganov, A. V. Samoylov,  $\mu^-$  capture by various nuclei; V. S. Demidov, V. G. Kirillov-Ugryumov, A. K. Ponomov, V. P. Protasov, F. M. Sergeyev, scattering of  $\pi^-$  mesons at 5 - 15 Mev in a propane bubble chamber; S. Ya. Nikitin, M. S. Aynutdinov, Ya. M. Selektor, S. M. Zombkovskiy, A. F. Grashin, muon production in  $\pi^+p$  interactions; B. A. Dolgoshein, spark chambers; N. G. Volkov, V. K. Lyapidevskiy, I. M. Obodovskiy, study of operation of a convection chamber; K. G. Finogenov, production of square voltage pulses of high amplitudes; G. N. Aleksakov, problems of color vision; V. K. Lyapidevskiy, relation between number of receivers and number of independent colors; Ye. M. Kudryavtsev, N. N. Sobolev, N. I. Tizengauzen, L. N. Tunitskiy, F. S. Fayzulov, determination of the moment of electron transition of oscillator forces and the widths of the Schumann-Runge bands of molecular oxygen; B. Ye. Gavrilov, A. V. Zharikov, V. I. Rayko, decomposition of the volume charge of intense ion beams; Ye. A. Kramer-Ageyev, V. S. Troshin, measurement of neutron spectra; G. G. Doroshenko, new methods of fast-neutron recording; V. I. Ivanov, dosimetry terminology; R. M. Voronkov, Card 2/4

S/056/62/043/001/048/056  
B102/B104

AUTHORS: Ivanov, Yu. M., Nikol'skiy, B. A., Smirnov, B. M.,  
Surkova, L. V.

TITLE:  $\mu^+$ -meson depolarization in an electric field

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,  
no. 1(7), 1962, 337-339

TEXT: The authors studied the effect which a strong electric field ( $E \sim 10^5$  v/cm) exerts on the depolarization of  $\mu^+$  mesons resulting from  $\pi-\mu$  decays in photoemulsions. Depolarization of stopped muons is attributed mainly to production of muonium ( $\mu^+e^-$ ); it has, however, also been observed (Swanson, Phys. Rev. 112, 580, 1958) that the "stopped"  $\mu^+$  meson precessed in a transverse magnetic field and showed no further depolarization. Thus, muonium must be produced within a very short time immediately after the stoppage. It has not yet been verified by experiment whether the  $\mu^+$  meson in condensed matter decays as a free

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$\mu^+$ -meson depolarization in an ...

S/056/62/043/001/048/056  
B102/B104

particle or after having been captured by a molecule. The authors found out that electrical fields of  $E \sim 10^5$  v/cm were able to cause additional depolarization of the stopped muon; which is indicative of a captured muon. Such fields cannot depolarize muons in free or in muonium state. The experiments were made at the synchrocyclotron of the OIYAI with a pulsed 85-Mev  $\pi^+$  beam (pulse duration 500  $\mu$ sec). The muons arising in  $\pi$ - $\mu$  decays were stopped in НИКФИ-Р (NIKFI-R) emulsions with increased gelatine content, placed between electrodes. The pulsed field in the emulsion was  $1.2 \cdot 10^5$  v/cm (400- $\mu$  emulsion layer) and  $2.4 \cdot 10^5$  v/cm (200  $\mu$ ). The additional muon depolarization observed when the field was switched on proves that the stopped muon is captured by a gelatine molecule. There is 1 table.

SUBMITTED: May 7, 1962

Card 2/2

S/056/62/043/002/029/053  
3104/3103

AUTHORS: Smirnov, B. M., Ivanov, Yu. M.

TITLE: The behavior of a  $\mu^+$ -meson in organic substances at low energies

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 557-560

TEXT: The inelastic scattering of a muon on the vibrational levels of a hydrogen molecule is investigated. This is done by means of the  $\Psi$  function of a triatomic molecule with stationary nuclei; the nuclear coordinates are contained in the Hamiltonian as parameters. The total energy of the system is  $E(R_{ab}, R_{ac}, R_{bc}) + T_a + T_b + T_c = \text{const}$ , where the indices a and b indicate the proton, c the  $\mu^+$ -meson, E is the energy of the triatomic molecule, T is the kinetic energy of the nuclei, and R is the distance between them. In the energy range  $0.01 \leq E \leq 1$  one has  $\tau_p \ll \tau_0$ ,  $T_{a,b} \ll T_c$  (2) ( $\tau_p$  - time of passage of the muon through the molecule,  $\tau_0$  - characteristic time of the  $H_2$  oscillations). The inter-

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S/C56/62/C-3/002/023/C53  
B104/B108

The behavior of a...

action potential is therefore  $V = E_{\text{tot}} + T_c = E(R_{ab}, R_{bc}, R_{ac})$ . By means of

the theory of sudden perturbations one obtains:  $C_k = \int_{-\infty}^{+\infty} V_{k0}(t) dt$  (where

$|C_k| \ll 1$ ) for the amplitude of the transition probability of the molecule to another vibrational level.  $V_{10} = (F_a - F_b)a_0/\sqrt{2}$  is derived for the interaction potential, so that  $C_1 = a_0(\Delta p_a - \Delta p_b)/\sqrt{2}$  (4) is the amplitude of the transition probability to the first level.  $a_0$  is the oscillation amplitude of the (harmonic) oscillator,  $F_a$  and  $F_b$  are the projections on the molecule axes of the forces acting on the protons when a muon passes,  $\Delta p$  is the projection of momentum. The probability amplitude can be obtained in this form also by the classical theory, provided that the conditions (2) are fulfilled. Conclusions: the particles are slowed down in a high-molecular substance mainly by the molecular oscillations (inelastic processes). The slowing-down power of a medium can be estimated

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S/056/62/043/002/028/053  
3104/3106

The behavior of a...

from (4). The inelastic scattering cross section is  $\sigma = \pi q^2 x_0^2 p^2 / 5 \cdot 2$ .

A possible charge exchange of the  $\mu^+$ -meson in the molecule is also pointed out. It is shown that in molecular hydrogen not all muons exchange their charge. All  $\mu^+$ -mesons decay in organic substances.

SUBMITTED: February 22, 1962

Card 3/3

IVANOV, Yu.M., doktor tekhn. nauk; MAZUR, F.F., nauchn. sotr.;  
POL'SHIN, D.Ye., kand. tekhn. nauk; FEDOROV, A.N.,  
nauchn. sotr.; SEREBRENNIKOV, L.S., nauchn. sotr.;  
SMORODINOV, M.I., kand. tekhn. nauk; DROZD, T.A., red.  
izd-va; MOCHALINA, Z.S., tekhn. red.

[Instructions on work involving the handling of radioactive substances in research establishments of the State Committee on Construction of the Council of Ministers of the U.S.S.R.] Instruksia po rabote s radioaktivnymi veshchestvami v nauchno-issledovatel'skikh uchrezhdeniiakh Gosstroia SSSR. Moskva, Gosstroizdat, 1963. 105 p.

(MIRA 17:2)

1. Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruktsiy. 2. Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruktsiy, Moscow (for Mazur). 3. Nauchno-issledovatel'skiy institut osnovaniy i podzemnykh sooruzheniy (for Fedorov, Smorodinov). 4. Nauchno-issledovatel'skiy institut stroitel'noy fiziki i ograzhdayushchikh konstruktsiy (for Serebrennikov).

SOURCE CODE: UR/0413/66/000/019/0124/0124

ACC NR: AP6035753

INVENTOR: Shebeko, N. G.; Lashko, S. V.; Svetlovidov, A. P.; Kamenskaya, Ye. A.;  
Ivanov, Yu. M.; Tikhonova, Ye. B.; Shikh, R. B.

ORG: none

TITLE: Alloy for <sup>10</sup>brazing refractory materials. <sup>27</sup>Class 49, No. 186837

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 19, 1966, 124

TOPIC TAGS: refractory metal, ~~refractory metal~~, ~~refractory metal~~, metal brazing, brazing alloy

ABSTRACT: <sup>27</sup>This Author Certificate introduces a niobium-base brazing alloy, containing titanium, and vanadium, for refractory materials. To improve the quality of a brazed joint, the composition of the alloy is set as follows: 20% vanadium, 10—20% titanium and the balance niobium.

SUB CODE: 11, 13/ SUBM DATE: 29Oct64/ ATD PRESS: 5106

UDC: 621.791.36

Card 1/1



13

Co

Processes and Properties Index

Influence of relaxation on the results of machine tests of materials. Vu, M. Ivanov. *J. Tech. Phys.* (U. S. S. R.) 8, 1020-30(1938).--From Maxwell's theory of elastic-plastic bodies expressions are derived for the relation between the strength and the rate of loading when the latter is const., or when the rate of deformation is const. The results are compared with the expts. of Perelygin (Zashch. Zavr. 7, 78(1938)). J. J. Bickerman

ASTM-SLA METALLURGICAL LITERATURE CLASSIFICATION

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

IVANOV, YU. N.

Ivanov, Yu. N. "The limiting conditions of statically indeterminate systems of wooden rods", in the collection: Issled. raboty po inzh. konstruktsiyam, Issue 2, Moscow, 1948, p. 114-38, - Bibliog: 5 items.

SO: U-3261, 10 April 53, (Letopis 'Zhurnal 'nykh Statey, No. 11, 1949).

IVANOV, Yu. M.

Ivanov, Yu. M. - " The basis of the new norms for designing woodend structures for 'Urok' location", Stroit. prom-st', 1949, No. 4, p. 20-22.

SO: U-4110, 17 July 53, (Letopis 'Zhurnal 'nykh Statey, No. 19, 1949).



176T36

IVANOV, Yu. M.

1 Aug 50

USSR/Engineering - Wood

"Influence of Swelling Upon Deformation of Prepressed Wood," V. A. Bazhenov, Yu. M. Ivanov, Timber Inst, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXIII, No 4, pp 663-666

Discusses results of investigation into deformation and also strength of dry wood first subjected to pressure in dry state and then to swelling in water with subsequent drying (seasoning). Graphs give deformation (mm) vs load (kg) for various species, stress directions, ect. Submitted 9 Jun 50 by Acad V. N. Sukachev.

PA 176T36

IVANOV, YU M.

PA 175T15

USSR/Engineering - Wood

11 Aug 50

"Breakdown of Wood During Secondary Stress After the Limit of Plastic Flow," Yu. M. Ivanov, Gen Sci Res Inst of Industrial Equipment

"Dok Ak Nauk SSSR" Vol LXXIII, No 5, pp 905-908

Investigates phenomenon where stress at moment of breakdown of wood possesses lower value, in the case of increasing loads periodically released, than yield strength (as defined for the case of continuously increasing loads), and sometimes lower than even stress reached in previous cycle of "load-unload." Graphs show relative deformation vs number of load-unload cycles, for various parameters. Submitted 9 Jun 50 by Acad V. N. Sukachev.

175T15

USSR/Geography - Literature

Jul/Aug 50

"Minutes of Expanded Meeting No 14 of the Scientific Council, Geographical Society of the USSR on 6 December 1949"

"Iz v-s Geograf Obschch" Vol LXXII, No 4, pp 433-439

Meeting was held to discuss criticism of the periodical "Iz v-s Geograf Obschch" and its editorial board which was published in "Literaturnaya Gazeta." Criticism was made by Alampiyev, one of the members of the editorial board, and most members of the Sci Council agreed with the criticism, concerned mainly with subject matter of articles published.

175T16



17A-V0V, Yu. M.

# USSR :

✓The buckling rupture of wood under compression parallel to the grain. Yu. M. Ivanov. *Trudy Inst. Lesn. Akad. Nauk S.S.S.R.* 9:115-20(1973).--Compression failure in various samples of birch, beech, and pine wood was studied. The oblique direction of buckling on tangential faces of rectangular prisms (with the lateral faces parallel to the tangential or radial plane) under compression is believed due to the resistance of the tangential cell wall to rupture across the grain, and not to the oblique arrangement of the rays, comp. resin ducts. Apparently failure around the rays, with the appearance of fold lines, is a secondary phenomenon.

John Lake Reith.



USSR :

The swelling pressure of wood. Yu. M. Ivanov. *Trudy Inst. Lesn. Akad. Nauk S.S.S.R.* 9, 226-41 (1933).—An instrument and method for detg. the swelling pressure of test samples of the sapwood and heartwood of dry pine, larch, spruce, birch, aspen, alder, beech, ash, and oak are described. The density in g. per cu. (dry basis), the percentage of H<sub>2</sub>O at max. swelling pressure (I), the time in min. to max. I, the I in kg. per sq. cm., and the limit of plastic flow in kg. per sq. cm. at 100% satn. are given.

John Lake Keays

**"APPROVED FOR RELEASE: 08/10/2001**

**CIA-RDP86-00513R000619210013-8**

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**CIA-RDP86-00513R000619210013-8"**

IVANOV, Yu.M.

High elasticity phenomenon in swollen wood. Dokl.AN SSSR 111 no.4:  
777-779 D '56. (MLRA 10:2)

1. Predstavleno akademikom V.N.Sukachevym.  
(Wood moisture) (Deformations (Mechanics))

IVANOV, Yu.M. (Moskva).

Elastic deformation of wood [with summary in English]. Koll. shur.  
19 no.3:293-298 My-Je '57. (MIRA 10:8)  
(Elasticity) (Wood)

IVANOV, Y. M., doktor tekhn.nauk, prof.; PANFILOVA, A. L., kand.tekhn.  
nauk, starshiy nauchnyy sotrudnik; GORDEYEV, P. A., red.izd-va;  
TEYTERMAN, T. M., tekhn.red.

[Rapid method for treating wood in a hot-and-cold bath] Usko-  
rennyi sposob propitki drevesiny v goriache-kholodnoi vanne.  
Moskva, Gos.izd-vo lit-ry po stroit., arkhitekt. i stroit. materia-  
lam. 1958. 42 p. (Akademiia stroitel'stva i arkhitektury SSSR.  
Institut stroitel'nykh konstruktsii. Nauchnoe soobshchenie, no.4)  
(MIRA 11:12)

(Wood--Preservation)

LIN'KOV, I.M., inzh.; IVANOV, YU.M., prof., doktor tekhn.nauk, red.;  
BORODINA, I.S., red. izd-va; SOLNTSEVA, L.M., tekhn. red.

[Increasing the durability of wooden forms for making precast reinforced concrete elements] Voprosy povysheniia obrachivaemosti dereviannykh form dlia sbornogo zhelezobetona. Moskva, Gos. izd-vo lit-ry po stroit., arkhitekt. i stroit. materialam, 1958. 57 p. (Akademiia stroitel'stva i arkhitektury SSSR. Institut stroitel'nykh konstruktsii. Nauchnoe soobshchenie, no.5) (MIRA 11:11)

1. Chlen-korrespondent Akademii stroitel'stva i arkhitektury SSSR (for Ivanov).  
(Concrete construction--Formwork)

IVANOV, Yu.M., prof.; PANFILOVA, A.L., nauchnyy sotrudnik; PANTEROV, K.V.,  
nauchnyy sotrudnik; PETRI, V.N., prof.; MOROZOV, M.I., nauchnyy  
sotrudnik; PERMIKIN, I.P., nauchnyy sotrudnik

Moisture-resistant parquet staves made of birch or beech. Rats. 1  
izobr. predl. v stroi. no.5:27-30 '58. (MIRA 11:6)

1. Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh  
konstruktsiy Akademii stroitel'stva i arkhitektury SSSR (for  
Panfilova, Panferov),stantsiya Perovo - 3 Moskovskoy oblasti.  
2. Sverdlovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo  
instituta promyshlennykh sooruzheniy (for Morozov, Permikin),  
Sverdlovsk, ul. Krenkelya, d.5. (MIRA 11:6)  
(Parquet floors)

IVANOV, Yu.M.; BAZHENOV, V.A.; VIKHROV, V.Ye., prof., doktor sel'skokhoz.  
nauk, otv.red.; KUZNETSOVA, Ye.B., red.izd-va; DORCKHINA, I.N.,  
tekhn.red.

[Investigation of the physical properties of wood; elasticity,  
permeability to air, pressure of swelling] Issledovaniia fizi-  
cheskikh svoistv drevesiny; elastichnost', vozdukhopronitsaemost',  
davlenie nabukhaniia. Moskva, Izd-vo Akad.nauk SSSR, 1959. 73 p.  
(MIRA 13:1)

(Wood--Testing)



BAZHENOV, Valeriy Afanas'yevich; IVANOV, Yu.M., prof., otv.red.;  
KUZNETSOVA, Ye.B., red.izd-va; ASTAF'YEVA, G., tekhn.red.

[Piezoelectric properties of wood] P'ezoelektricheskie  
svoistva drevesiny. Moskva, Izd-vo Akad.nauk SSSR, 1959.  
238 p. (MIRA 12:12)

1. Chlen-korrespondent Akademii arkhitektury i stroitel'stva  
SSSR (for Ivanov).  
(Wood--Electric properties) (Piezoelectricity)

IVANOV, Yu.M., prof., doktor tekhn.nauk, red.; TUMARKIN, D.M., inzh.,  
nauchnyy red.; BUDARINA, E.M., red.izd-va; KL'KINA, E.M.,  
tekhn.red.

[Using wood and plastics in building; collection of articles]  
Voprosy primeneniia dereva i plasticheskikh mass v stroitel'stve;  
sbornik statei. Pod red. IU.M.Ivanova. Moskva, Gos.izd-vo lit-ry  
po stroit., arkhitekt. i stroit.materialam, 1960. 238 p.

(MIRA 13:9)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut stroi-  
tel'nykh konstruktsiy. 2. Chlen-korrespondent Akademii stroitel'stva  
i arkhitektury SSSR (for Ivanov).  
(Plastics) (Building, Wooden)

IVANOV, Yu.M., prof.; PANFILOVA, A.L., starshiy nauchnyy sotrudnik, kand. tekhn. nauk; LEPARSKIY, L.O., mladshiy nauchnyy sotr.; PETROVA, V.V., red. izd-va; BOROVNEV, N.K., tekhn. red.

[Instructions for the impregnation of wooden parts in hot and cold baths by the method developed by the Central Scientific Research Institute of Structures] Ukazaniia po propitke sposobom TsNIISK dereviannykh detalei v goriache-kholodnykh vannakh. Moskva, Gos.izd-vo lit-ry po stroit., arkhitekt. i stroit. materialam, 1961. 24 p. (MIRA 14:12)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut stroitel'nykh konstruksii.

(Wood--Preservation)

IVANOV, Yu.M.

"Internal stresses occurring in wood during drying" by B.N.Ugolev.  
Reviewed by IU.M.Ivanov. Der.prom. 10 no.1:27-28 Ja '61.  
(MIFA 14:2)

1. Chlen-korrespondent Akademii stroitel'stva i arkhitektury SSSR.  
(Lumber--Drying) (Ugolev, B.N.)

IVANOV, Yu.M.

Diffusion of polar substances through the cell walls of wood. Zhur.  
prikl.khim. 35 no.11:2578-2580 N '62. (MIRA 15:12)  
(Wood) (Diffusion)

IVANOV, Yu.M., doktor tekhn.nauk

Estimating the protective properties of varnish coverings against  
the deformation of wood. Der. prom. 12 no.9:3-5 S '63.  
(MIRA 16:10)

1. Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh  
konstruktsiy Akademii stroitel'stva i arkhitektury SSSR.

IVANOV, Yu.M., doktor tekhn. nauk; PANFILOVA, A.L., kand. tekhn. nauk

Investigation of antisepticizing and fireproofing methods to  
preserve the wooden framework of outside wall panels. Trudy  
TSNIISK no.26:42-61 '63. (MIRA 16:8)

(Fireproofing) (Walls)

IVANOV, Yu.M.

Diffusion into cell walls of wood. Trudy Inst. lesa i drev. 65:  
3-19 '63. (MIRA 16:10)



KHRULEV, V.M., kand. tekhn. nauk; IVANOV, Yu.M., prof., doktor  
tekhn. nauk, red.; STRASHNYKH, V.P., red.izd-va; BRUSINA,  
L.N., tekhn. red.

[Instructions for quality control of glued joints in wooden  
structures and building elements] Instruktsiia po kontroliu  
kachestva kleevykh soedinenii v dereviannykh konstruktsiakh  
i stroitel'nykh detaliakh. Moskva, Stroiizdat, 1964. 25 p.  
(MIRA 17:2)

1. Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut  
stroitel'nykh konstruktsiy.

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ALEKSANDROV, A.N., kapitan 1-go ranga; IVANOV, Yu.M., kapitan 1-go ranga;  
KIFAREV, G.L., kapitan 1-go ranga

A fundamental work. Mor. sber. 47 no.4:91-93 Ap '64.  
(MIRA 18:7)

IVANOV, Yu.M.

Long-time strength of polymeric materials. Vysokom.sped. 7 no.7:1291-  
1292 JI '65. (MIRA 18:8)

IVANOV, Yu.M.

Treatment with depression of reserpin-resistant forms of hypertension.  
Sov. med. 27 no.11:105-108 N '64. (MIRA 18:7)

1. Kafedra gospiatal'noy terapii (zav. - prof. L.S.Shvarts) lechenbnogo  
fakul'teta Saratovskogo meditsinskogo instituta.

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SUB CODE: AM

ENCL: 00

IVANOV, Yu.M.; YARKHO, Ye.A., inzh., retsenzenty; KAFUSIN,  
N.M., kand. tekhn. nauk, red.

[Plastic technological equipment for machine tools]  
Plastmassovaia tekhnologicheskaya osnastka k stankam. Mo-  
skva, Mashinostroenie, 1964. 157 p. (MIRA 18:3)

TEMASHOV, N. I. Zashch., Yr. M.

Investigating the effect of the degree of deformation and the annealing temperature on the electrochemical corrosion of titanium and a titanium alloy with a 0.2-percent palladium content. Zashch.met. 1 no.1:36-41 Ja-F '65. (NIRA 18:5)

1. Institut fizicheskoy khimii AN SSSR i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti.

TOMASHOV, N.D.; SHCHULEPNIKOV, M.N.; IVANOV, Yu.M.

Investigating the mechanism of the protective action of palladium in corrosion-resistant titanium-palladium alloys by the radio-chemical method. Zashch.met. 1 no.1:122-123 Ja-F '65.

(MIRA 18:5)

1. Institut fizicheskoy khimii AN SSSR i Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskey promyshlennosti.

3.2200 (1019, 1080, 1132)

21.700  
S/020/61/137/005/011/026  
B104/B214

AUTHORS: Grodzovskiy, G. L., Ivanov, Yu. N., and Tokarev, V. V.

TITLE: Motion of a body with variable mass and constant power consumption in a gravitational field

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 5, 1961, 1082-1085

TEXT: The present paper gives a study of the general case of the optimization of the reactive motion of a body with variable mass in a gravitational field of two centers when the power consumption is constant. For a given trajectory, the acceleration is equal to  $a(t) = -Vdm/mdt$ , where  $V$  is the escape velocity. The utilizable reactive power may be written

as  $N = -dmV^2/2dt$ . Thus,  $a^2/2N = -dm/m^2dt$ . This gives by integration the

weight of the body as a function of time:  $G = G_0 \left( 1 + \int_0^T \frac{G_0}{2Ng} a^2 dt \right)$ . The

specific weight of the power source is defined as:  $\alpha = G_H/N$ , and the

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B104/E214

Motion of a body with variable ...

relative total weight initially is given by  $\bar{G} = (G_M + G_N)/G_0$

$= \alpha |N/G_0 + 1 - 1 - 1| \left( 1 + \int_0^T \frac{G_0}{2NG} a^2 dt \right)$ . For a given  $a(t)$  the quantity  $\bar{G}$

has a minimum:  $\bar{G}_{\min} = 2\sqrt{\bar{G} - \phi}$  at  $(G_N/G_0)_{\text{opt}} = (\alpha N/G_0)_{\text{opt}} = \sqrt{\bar{G} - \phi}$ ,

where  $\phi = \frac{\alpha}{2G} \int_0^T a^2 dt$ . In the case of a step by step decrease of power

related to a decrease in weight, the maximum relative utilizable weight may be calculated from the formula

$$\bar{G}_{n, \max} = (1 + \phi_1 - 2\sqrt{\phi_1}) \prod_{i=2}^n \left( \frac{1 - \phi_i}{1 + \phi_i} \right)^2 \quad (4), \quad (4).$$

Here,  $\sum \phi_i = \phi$  is given. The optimum ratio between the  $\phi_i$  may be

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Motion of a body with variable ...

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obtained from (4) by differentiation. Fig. 1 graphically shows  $\bar{G}_{\min}$  and  $G_{\min}/G_0$  as functions of  $\phi$ . As is seen from this graph, a minimum of  $\bar{G}$

requires a minimum of the integral  $\int_0^T a^2 dt$ . As an illustration, the

motion in a plane spiral is studied in the case of small accelerations.

The result obtained is:  $r/R_0 = 1 / \left( 1 - \int_0^t k(t) dt / \frac{R_0}{v_0} \right)^2$ . The next topic

studied is the optimum displacement of a body of variable mass in the time T between two given points. This problem leads to a variation problem for

the integral  $I = \int_0^T a^2(t) dt$ . Here, the plane motion in the gravitational

field of two centers is investigated, one of which is at rest and the other

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Motion of a body with variable ...

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B104/B214

moves with constant angular velocity  $\omega$  on a circle of radius  $r_0$  about this center. In order to study the motion of the body in a region in which one of the two centers has a dominating effect on the motion of the body, it is convenient to place the reference system in this center. On these assumptions, the integral of the variation problem introduced above yields the integral

$$I = \int_0^T \left\{ \left[ \ddot{r}_l - r_l (\dot{\psi}_l + \omega)^2 + \frac{k_l}{r_l^2} - \mathfrak{N}_l \right]^2 + \left[ r_l \ddot{\psi}_l + 2\dot{r}_l (\dot{\psi}_l + \omega) \Psi_l \right]^2 \right\} dt. \quad (9)$$

Euler's equations of this variation problem are:

$$\dot{a}_{r_l} = \frac{1}{v_{r_l}} \left[ \frac{a_{r_l}^2 + a_{\psi_l}^2}{2} + a_{r_l} \left( \frac{v_{\psi_l}^2}{r_l} - \frac{k_l}{r_l^2} \right) - \lambda_l - v_l \frac{v_{\psi_l}}{r_l} \right], \quad (10)$$

$$\dot{a}_{\psi_l} = \frac{1}{r_l} (a_{\psi_l} v_{r_l} - 2a_{r_l} v_{\psi_l} + v_l); \quad (11)$$

$$\dot{v}_l = a_{\psi_l} \Psi_{l\psi_l} + a_{r_l} \mathfrak{N}_l \Psi_l; \quad (12)$$

$$\dot{\lambda}_l = -v_{r_l} \left( a_{\psi_l} \Psi_{lr_l} + a_{r_l} \mathfrak{N}_{lr_l} + \frac{\Psi_l a_{\psi_l}}{r_l} \right) - v_l \frac{\Psi_l}{r_l} - \dot{a}_{r_l} \mathfrak{N}_l - \frac{v_{\psi_l}}{r_l} (v_l - 2a_{r_l} \Psi_l);$$

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B104/B214

Motion of a body with variable ...

$$v_{r_i} = \dot{r}_i, \quad v_{\phi_i} = r_i(\dot{\psi}_i + \omega). \quad (14)$$

The problem is simplified and limited to the following variation problem:  
It is desired to find a trajectory which gives a minimum for

$\int_{r_1}^{r_2} a^2 dr / v_r$  under the additional isoperimetric condition. The time for  
the displacement from  $r_1$  to  $r_2$   $\left( T = \int_{r_1}^{r_2} dr / v_r \right)$  and the polar angle of  
the displacement  $\Delta\psi = \int_{r_1}^{r_2} v_\phi dr / r dr$  are given. With their help, expressions

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S/020/61/137/005/011/026

B104/B214

Motion of a body with variable ...

can be found for  $\dot{a}_r$  and  $\dot{a}$  which agree with (10) and (11) for  $\kappa = 2\lambda$ , and  $\kappa_2 = 2\nu$ . It is shown that in the case of the free fall along the optimum trajectory the acceleration varies linearly with time. Finally, the singularities of the system are also studied. There are 2 figures and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J. H. Irving, E. K. Blum, Vistas in Astronautics, 2, Second Annual Astronautics Symposium, 1959.

ASSOCIATION: Tsentral'nyy aero-gidrodinamicheskii institut im. N. Ye. Zhukovskogo (Central Institute of Aero- and Hydrodynamics imeni N. Ye. Zhukovskiy)

PRESENTED: August 1, 1960, by L. I. Sedov, Academician

SUBMITTED: July 24, 1960

Card 6/7

AUTHOR: Rodzoverskiy, G. L. (Moscow); Ivanov, Yu. N. (Moscow);  
Tokarev, I. V. (Moscow)

TITLE: The mechanics of space flight with low thrust. I.

SOURCE: Inzhenernyy zhurnal, v. 3, no. 3, 1963, 590-615

TOPIC TAGS: space flight, solar sail, low thrust, rocket thrust,  
space ship, space flight mechanics, low thrust rocket, low thrust  
vehicle

ABSTRACT: This article is the first in a series of review articles  
dealing with the mechanics of space flight at low thrust. On the  
basis of Soviet and non-Soviet sources the article reviews these  
principal subject areas: 1) the mechanics of space flight with a  
solar-sail space vessel, including fundamental relationships and  
problems and the flight of such a vessel between planetary orbits  
and its escape from a gravitational field; and 2) the mechanics of  
space flight with low-thrust engines, including the selection of  
optimum weight ratios for simpler cases of motion and an ideal

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L 17077-63

ACCESSION NR: AP3006364

control system with optimum weight and thrust control. The following recent works are noted among the 20 Soviet sources reviewed: V. K. Isayev, "The principle of L. S. Pontryagin's maximum and the optimum programing of rocket thrust," *Avtomatika i telemekhanika*, v. 22, no. 8, 1961, and v. 23, no. 1, 1962; A. N. Zhukov and V. N. Lebedev, "A variational problem in flight between heliocentric circular orbits by means of a solar sail," *Sb. Iskusstvennyye sputniki Zemli*, 1963, in publication; A. A. Karymov, "Determination of forces and moments of light pressure acting on a body moving in space," *Prikl. matem. i mekhan.*, v. 26, no. 5, 1962; G. L. Grodzovskiy, "Optimization of parameters of motion of a body with variable mass and limited power consumption in the presence of a nonlinear dependence between the power source weight and the power output," *Izv. AN SSSR, Otd. tekhn.* N. 1963, in publication; and Yu. N. Ivanov, "The motion of a body with variable mass, limited power output, and given time of operation," *Prikl. matem. i mekhan.*, v. 27, no. 5, 1963. Orig. art. has: 25 figures, and 70 formulas.

ASSOCIATION: none  
SUBMITTED: 00  
SUB CODE: AS

DATE ACQ: 27Sep63  
NC REF SOV: 020

ENCL: 00  
OTHER: 053

Card 2/2

GRODZOVSKIY, G.L. (Moskva); IVANOV, Yu.N. (Moskva); TORAIKEV, V.V. (Moskva)

Mechanics of space flight with low thrust. Part 2.. Inzh.zhur. 3  
no.4:748-766 '63. (MIRA 16:12)

ACCESSION NR: APL015971

S/0040/63/027/005/0854/0863

AUTHOR: Ivanov, Yu. N. (Moscow)

TITLE: Motion of a variable mass body with limited power and given active time

SOURCE: Prikl. matem. i mekhan., v. 27, no. 5, 1963, 854-863

TOPIC TAGS: variable mass body, limited power, active time, optimal running time, variational problem, plane parallel gravitational field, limiting case, Mayer problem

ABSTRACT: Several authors have studied optimal working conditions for motion of a variable mass body with limited power of the reactive jet, for optimal running time of the engines. The author generalizes these results by proposing a general method for solving the variational problem with given active time which is less than optimal. He formulates the variational problem for the case in the title and illustrates the general results by analyzing optimal motion in a plane-parallel gravitational field. He investigates two limiting cases for regulating a propulsion system: an ideally regulatable system (variable optimal thrust) and a nonregulatable system (constant thrust). Orig. art. has: 5 figures and 40 formulas.

Card 1/2



ACCESSION NR: AP4015971

ASSOCIATION: none

SUBMITTED: 19Jan63

DATE ACQ: 21Nov63

ENCL: 00

SUB CODE: IM, AI

NO REF SOV: 005

OTHER: 006

Card 2/2

*Yuc*  
IVANOV, I. N.

"On the Motion of a Body of Variable Mass with Constant and  
Decreasing Tower Consumption in a Graviational Field."

Report presented at the 14th International Astronautics Congress,  
Paris, France, 25-Sept- 1 Oct 1963.

GRODZOVSKY, G.L. ;IVANOV, Yu.N.; TOKAREV, V.V. (Moscow)

"Mechanics of space flight with low thrust".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

BR

ACCESSION NR: AP4035057

S/0179/64/000/002/0009/0018

AUTHOR: Ivanov, Yu. N. (Moscow)

TITLE: Optimal coupling of propulsion systems

SOURCE: AN SSSR. Izvestiya. Mekhanika i mashinostroyeniye, no. 2, 1964, 9-18

TOPIC TAGS: propulsion, jet propulsion, rocketry, rocket thrust calculation, two stage rocket, rocket motor, jet engine, low thrust rocket motor, rocket motor airborne regulation, stage firing pattern, gas discharge rate

ABSTRACT: Mathematical solutions are presented for variational problems on the optimal coupling of arbitrary propulsion systems, as well as controlled thrust engines in tandem with engines characterized by a controlled rate of escape flow. The weight of the latter is assumed to be proportional to maximum generated thrust, that of the former to peak power or to the sum of two terms, one being proportional to maximum power and the other to maximum thrust. Parallel and succession firing patterns are discussed for engines which can or cannot be regulated in flight. The variational problems are reduced to boundary problems for common differential equations and can be solved as Cauchy's problems with selection of inadequate initial magnitudes. Orig. art. has: 57 formulas.

Card ~~172~~ ASSOCIATION: none

ACCESSION NR: AP4041565

S/0293/64/002/003/0414/0432

AUTHOR: Ivanov, Yu. N.; Tokarev, V. V.; Shalayev, Yu. V.

TITLE: Optimum trajectories and parameters of space vehicles with limited-power engines

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 414-432

TOPIC TAGS: optimum trajectory, interplanetary trajectory, optimum interplanetary trajectory, space vehicle weight, space vehicle weight parameter

ABSTRACT: A plane problem of the round-trip flight of a cosmic vehicle from the gravitational field of the earth to that of another planet is discussed. This problem of transportation of a maximum load (in variational formulation) consists of determining the optimum trajectories and optimum control of the acceleration vector due to thrust, and of the selection of the optimum weight parameters of vehicle components. The trajectory of such a flight consists of the following sections: 1) acceleration and take-off from an orbit around the earth in the terrestrial gravitational field; 2) flight

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ACCESSION NR: AP4041565

in the central field of the sun; 3) deceleration in the gravitational field of the planet and entering some orbit around it; 4) acceleration and take-off from that orbit; 5) return flight; and 6) deceleration and entering some orbit around the earth. The results of the calculation of optimum trajectories of the flight to an external planet (Mars) and internal planet (Venus) are given, as well as the data on the optimum acceleration and deceleration sections of the trajectories, and on the negligible effect of the gravitational fields of planets during flight between their orbits. For the sake of simplicity it is assumed that the orbits of planets are circular and coplanar. Orig. art. has: 17 figures, 5 tables, and 40 formulas.

ASSOCIATION: none

SUBMITTED: 21Aug63

ATD PRESS: 3055

ENCL: 00

SUB CODE: SV

NO REF SOV: 002

OTHER: 001

Card 2/2

ACCESSION NR: AP4041566

S/0293/64/002/003/0433/0440

AUTHOR: Ivanov, Yu. N.; Shalayev, Yu. V.

TITLE: Method of steepest descent applied to determining interorbital trajectories with limited-power engines

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 439-440

TOPIC TAGS: space trajectory, steepest descent method, interorbital trajectory, limitedpower engine, optimum round trip flight

ABSTRACT: Two methods are discussed for solving the variational plane-flight problem of a space vehicle equipped with a limited-power engine between coplanar circular orbits in a central gravitational field: 1) Ritz's method, with determination of the coefficients by the steepest-descent method; and 2) the method of functional steepest descent. The selection of optimum flight trajectories and optimum regimes of operation of an ideal engine of limited power is reduced to the determination of the minimum extremals of the functional

$$J = \int_0^T a^2 dt,$$

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ACCESSION NR: AP4041566

where  $a$  is the acceleration due to reactive thrust and  $T$  is the time of motion. The character of the convergence of the functional  $J$  in both methods of solution is shown in diagrams, and the much shorter time of calculation on electronic digital computers by the second method is pointed out. The conditions for optimum round-trip flight (with return on the initial orbit) for cases of "symmetrical" and "asymmetrical" return flights are also examined. Orig. art. has: 9 figures and 12 formulas.

ASSOCIATION: none

SUBMITTED: 21Aug63

ATD PRESS: 3059

ENCL: 00

SUB CODE: SV

NO REF SOV: 006

OTHER: 005

Card 2/2



ACCESSION NR: AP4026965

S/0258/64/004/001/0168/0196

AUTHORS: Grodzovskiy, G. L. (Moscow); Ivanov, Yu. N. (Moscow); Tokarev, V. V. (Moscow).

TITLE: Mechanics of low thrust cosmic flights. 3.

SOURCE: Inzhenernyy zhurnal, v. 4, no. 1, 1964, 168-196

TOPIC TAGS: cosmic flight optimization, power-limited vehicle, exhaust velocity, thrust vector, maximum payload, flight trajectory

ABSTRACT: The third and last series in the analysis of cosmic flight optimization of power-limited vehicles has been presented. Part One dealt with the limits of the regulating characteristics of the vehicle system. The attainable variation range for flow rate  $q$  and exhaust velocity  $V$  is investigated as a function of maximum jet thrust power  $N_{\max}$ . The optimum control of the thrust vector,  $V$  and  $N$  are discussed under the conditions

$$0 \leq N(t) \leq N_{\max}(V) \leq N_0,$$

$$0 \leq V_{\min} \leq V(t) \leq V_{\max} < \infty.$$

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ACCESSION NR: AP4026965

An expression is derived relating the power source weight  $G_p$  to the flight trajectory characteristics. In Part Two the motion of a power-limited vehicle is discussed for the case of engine operation time less than the vehicle flight duration. The variational problem is considered under variable thrust power flow rate and thrust vector conditions with the optimum combination of power-limited and exhaust velocity-limited engines. It is shown that this combination yields an advantage in total payload if each type of engine has the same payload before combination. Part Four deals with reliability in engine performance for missions of long duration. The optimization criterion assumed here is the condition of a minimum in the sum of average necessary and reserve fuel weights plus the dead weight of the engine. An example is given where it is shown that in a round trip mission the departure leg takes place faster than the return leg of the trip, shifting the given engine-time break to the beginning of the trajectory. The optimization studies are extended to include weights in addition to the previously considered weights of working substance, power source, and payload. Finally, mid-course correction possibilities are studied, including corrections in velocity and position, and a general expression is derived for the optimal correction moment distribution. Orig. art. has: 145 equations, 11 figures, and 1 table.

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APPROVED FOR RELEASE: 08/10/2001

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ACCESSION NR: AP4013390

S/0040/64/028/001/0166/0170

AUTHOR: Ivanov, Yu. N. (Moscow)

TITLE: Additional weight components in problems of optimizing motion with limited power

SOURCE: Prikladnaya matematika i mekhanika, v. 28, no. 1, 1964, 166-170

TOPIC TAGS: weight component, optimal motion, limited power, payload, power source, working mass, engine weight, jet stream, variational problem

ABSTRACT: In most work on optimal motion with limited power it is assumed that the system consists of three weight components: payload, weight of power source, and weight of fuel. More detailed analysis requires the inclusion of additional weight components in the weight formula. The author makes a qualitative study of the properties of optimal control, considering the weight of the engine and the weight of the working mass for the power source. The controlling functions are chosen to be optimal in the sense of guaranteeing maximum payload for fixed initial weight, given initial and final points in the phase space, and fixed time

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ACCESSION NR: AP4013390

of motion. Orig. art. has: 30 formulas.

ASSOCIATION: none

SUBMITTED: 13Dec63

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: AI

NO REF SOV: 004

OTHER: 002

Card 2/2



ACCESSION NR: AP4040579

S/0040/64/028/003/0528/0533

AUTHOR: Ivanov, Yu. N. (Moscow)

TITLE: Stepwise approximation of optimal controls

SOURCE: Prikladnaya matematika i mekhanika, v. 28, no. 3, 1964, 528-533

TOPIC TAGS: stepwise approximation, optimal control, optimal position, optimal motion

ABSTRACT: The author is concerned with finding a simple optimal control law. By simple, he means a control law which consists of changing the positions of a regulator a finite number of times. He finds an algorithm for choosing optimal positions and optimal moments for switching positions and he gives examples dealing with optimal motion of a variable mass body with constant use of power. The problem of best approximation of a complicated law by a simple one is studied, i.e., replacing a complicated continuous controlling function by a piecewise-constant one with a given number of levels. Then, instead of an infinite number of positions, there is a given number whose interchange is done at optimal moments of time. Orig. art. has: 30 formulas and 2 figures.

ASSOCIATION: none

Card 1/2

ACCESSION NR: AP4040579

SUBMITTED: 13Nov63

DATE ACQ: 19Jun64

ENCL: 00

SUB CODE: MA, ME

NO REF SOV: 006

OTHER: 000

Card 2/2

L 15218-66 EWT(1)/EWP(m)/ES(v)-3/EWA(d) GW

ACC NR: AP5026048

SOURCE CODE: UR/0293/65/003/005/0687/0693

AUTHORS: Ivanov, Yu. N.; Shalayev, Yu. V.

ORG: none

TITLE: Optimum precession of the plane of a circular orbit by a transverse force

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 5, 1965, 687-693

TOPIC TAGS: artificial satellite orbit, circular orbit, vehicle engine, propulsion thrust, variational problem, Hamilton equation, linear differential equation

ABSTRACT: This paper is devoted to determining the optimum laws for thrust action in the maneuver of turning the plane of a circular orbit. The case of small angles is examined, and linear equations are then studied and solved analytically. Variational problems are formulated for ideal engines and uncontrollable engines. The differential equations of motion and boundary conditions describing the dynamic maneuver are:

$$\begin{aligned} \dot{r} &= v, & \dot{v} &= ae + R(r, t), \\ r(0) &= r_0, & v(0) &= v_0, \\ r(T) &= r_1, & v(T) &= v_1. \end{aligned}$$

for an ideal engine of limited power. Differential equations describing the maneuver in question are derived:  $\chi = ae \sin(t - \Omega_1)$ ,  $\omega = ae \cos(t - \Omega_2)$ ,

$$\begin{aligned} \chi(0) &= 0, & \omega(0) &= 0, \\ \chi(T) &= 0, & \omega(T) &= 0. \end{aligned}$$

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ACC NR: AP5026048

The variational problems for the two types of engines are formulated under the assumption that the modulus of reactive acceleration "a" reaches a maximum when crossing the nodal line, and that the control functional  $J_1$  is not a function of the position of the nodal line. For an arbitrary angle  $\Omega_1$  that differs from  $\Omega_1^*$ , the laws of  $e(t)$  and  $\delta(t)$ : I. for  $-T_M/4s \leq \Omega_1 \leq T_M/4s$

$$\begin{aligned} e &= +1, \quad \delta = 1 \quad \text{when} \quad 0 \leq t \leq t_1, \quad t_1 = \Omega_1 + T_M/4s, \\ e &= -1, \quad \delta = 1 \quad \text{when} \quad t_2 \leq t \leq t_1 + \pi, \quad t_2 = \pi + \Omega_1 - T_M/4s, \\ e &= +1, \quad \delta = 1 \quad \text{when} \quad t_2 + \pi \leq t \leq t_1 + 2\pi, \\ e &= (-1)^{m-1}, \quad \delta = 1 \quad \text{when} \quad t_2 + (m-2)\pi \leq t \leq t_1 + (m-1)\pi, \end{aligned}$$

II. for  $T_M'/4s \leq \Omega_1 \leq \pi - T_M/4s$

$$\begin{aligned} e &= +1, \quad \delta = 1 \quad \text{when} \quad t_1 \leq t \leq t_2, \quad t_1 = \Omega_1 - T_M/4s, \\ e &= -1, \quad \delta = 1 \quad \text{when} \quad t_1 + \pi \leq t \leq t_2 + \pi, \quad t_2 = \Omega_1 + T_M/4s, \\ e &= +1, \quad \delta = 1 \quad \text{when} \quad t_1 + 2\pi \leq t \leq t_2 + 2\pi, \\ e &= (-1)^{m-1}, \quad \delta = 1 \quad \text{when} \quad t_1 + (m-1)\pi \leq t \leq t_2 + (m-1)\pi, \end{aligned} \quad (3.21)$$

The authors thank D. Ye. Okhotsimskiy for valuable advice and attention. Orig. art. has: 43 formulas.

SUB CODE: 22/ SUBM DATE: 05Jun64/ SOV REF: 004/ OTH REF: 004/

Card 2/2